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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/651,679

08/29/2003

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EXAMINER

GOMA, TAWFIK A

ART UNIT

PAPER NUMBER

2627

MAIL DATE

DELIVERY MODE

06/27/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/651,679	IKENAKA ET AL.	
	Examiner	Art Unit	
	TAWFIK GOMA	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 14, 104-106, 112 and 116-118 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 14, 104-106, 112 and 116-118 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to the election filed on 4/07/2008.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 14, 104, 112 and 116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiono et al (US 6834036) in view of Arai et al (US 6870805).

Regarding claims 1 and 112, Shiono discloses an optical pickup apparatus, comprising: a first light source to emit a light flux of a wavelength λ_1 (col. 25 lines 56-63) for conducting recording and/or reproducing information for a first optical information recording medium having a protective substrate having a thickness t_1 (col. 26 lines 6-15); a second light source to emit a light flux of a wavelength λ_2 ($\lambda_1 < \lambda_2$) (col. 26 lines 2-7, λ_3) for conducting recording and/or reproducing information for a second optical information recording medium having a protective substrate having a thickness t_2 ($t_1 \geq t_2$) (col. 26 lines 4-7); a third light source to emit a light flux of a wavelength λ_3 ($\lambda_2 < \lambda_3$) (col. 25 lines 64-67) for conducting recording and/or reproducing information for a third optical information recording medium having a protective substrate having a thickness t_3 ($t_2 < t_3$) (col. 26 lines 1-2); an objective optical element into which an infinite parallel light flux comes when recording and/or reproducing information is conducted for the first, second and third optical information recording mediums (col. 6 lines 45-49); wherein the objective optical element comprises a first diffractive structure

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(19a fig. 8 and fig. 9); wherein a converged-light spot is formed on the first optical information recording medium with m-th order (m is a natural number) diffracted-light ray of the wavelength λ_1 generated by the first diffractive structure (col. 26 lines 15-23), a converged-light spot is formed on the second optical information recording medium with n-th order (n is a natural number) diffracted-light ray of the wavelength λ_2 generated by the first diffractive structure (col. 26 lines 27-31), and a converged-light spot is formed on the third optical information recording medium with k-th order (k is a natural number) diffracted-light ray of the wavelength λ_3 generated by the first diffractive structure (col. 26 lines 23-27), and wherein one of m, n and k is different from one of other two numbers (col. 26 lines 15-31).

Further regarding claims 1 and 112, Shiono fails to disclose wherein the light flux of the wavelength λ_3 which has passed an area of the objective optical element which is out of an area within NA3 becomes a flare, NA3 being a numerical aperture for the converged light spot formed on the third optical information recording medium with the light flux of the wavelength λ_3 . In the same field of endeavor, Arai discloses wherein light that passes outside of the NA3 becomes a flare (col. 44 lines 59-67 through col. 45 lines 1-22). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the light outside of NA3 be a flare. The rationale is as follows: One of ordinary skill in the art would have been motivated to have the light outside the NA3 be a flare in order to have only a light of wavelength λ_3 which corresponds to NA3 used for recording of the information and to eliminate interference of other wavelengths.

Further regarding claims 1 and 112, Shiono in view of Arai fail to disclose wherein the objective optical element comprises a different diffractive structure which is farther from the

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optical axis of the objective optical element than the first diffractive structure and wherein the diffractive order number of the light flux of the wavelength λ_3 having passed the different diffractive structure of the diffractive structure is different from the diffraction order number of the light flux of the wavelength λ_3 having passed the first diffractive structure. In the same field of endeavor, Maruyama discloses providing an objective element with first and second diffractive structures that are different distances from the optical axis (fig. 3a) and wherein the orders of light having passed the first diffractive structure are different than the orders of light having passed the other diffractive structure (col. 11 lines 25-54, Table 1 P coefficients). It would have been obvious to one of ordinary skill in the art to use the diffractive structure of the lens disclosed by Maruyama. The rationale is as follows: One of ordinary skill in the art would have been motivated to use the diffractive structure in Maruyama in order to optimize an optical path difference function (see Maruyama col. 10 lines 30-41).

Regarding claim 14, Shiono further discloses an optical correcting structure to conduct temperature compensation and chromatic aberration compensation (col. 31 lines 36-54).

Regarding claims 104 and 116, Shiono further discloses wherein the first diffractive structure comprises a plurality of diffracting ring-shaped zones representing a serrated discontinuous surface (fig. 9), and at least one of the diffracting ring shaped zone comprises optical path difference furnishing structure (fig. 8 and col. 20 lines 22-39).

Claims 105, 106, 117 and 118 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiono et al (US 6834036) in view of Arai et al (US 6870805) and further in view of Takeuchi et al (US 6807019).

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Regarding claims 105, 106, 117 and 118, Shiono in view of Arai fail to disclose wherein (m, n, k) is (2,1,1), (3,2,2), (5,3,2) or (10,6,5). In the same field of endeavor, Takeuchi discloses using (3,2,2) as the orders of light (col. 9 lines 1-12). It would have been obvious to use the orders disclosed by Takeuchi. The rationale is as follows: One of ordinary skill in the art at the time of the applicant's invention would have been motivated to use the orders of light disclosed by Takeuchi in order to avoid interference between the lights and to achieve a high diffraction efficiency using a single diffractive element.

Further regarding claims 106 and 118, Shiono fails to disclose wherein λ_1 is between 390-420 nm, λ_2 is between 630-680 nm and λ_3 is between 750-800 nm. In the same field of endeavor, Takeuchi discloses the wavelengths claims (Table 8, col. 8). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to use the wavelengths of Takeuchi. The rationale is as follows: One of ordinary skill in the art would have been motivated to use the wavelengths in order to have an apparatus that is compatible with CD's, DVD's and HD-DVD's.

Response to Arguments

Applicant's arguments with respect to claims 1, 14, 104-106, 112, and 116-118 have been considered but are not persuasive. Applicant's arguments that Maruyama fails to disclose wherein the diffractive order numbers are different in the different regions of the lens are not persuasive for the following reasons: First, Maruyama discloses in Table 1 the coefficients that are associated with each of the orders and their values for each of the regions of the lens (i.e. P2c, P2e are the coefficients for second order light, see col. 9 lines 16-39). These coefficients are related to the optical path difference which is caused by the corresponding section of the lens

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and affects the order of light which exits the lens. It is clear from Table 1 the coefficients have different values for the different regions, and therefore the order numbers are different for the different regions.

Secondly, applicant's arguments with respect to the order being 1 for all sections of the lens is not persuasive because applicant's derivation of the order is miscalculated. Applicant's arguments, page 33, relies on the formula $m = (n-1) \times d/\lambda$ in order to derive the order number m using the values provided by Maruyama in Table 1. Contrary to applicant's assertion that it is well known to those skilled in the art that this formula provides the order number calculation, the formula used by applicant is not accurate. The correct formula for modeling diffraction is:

$$n_2 \sin \theta_2 - n_1 \sin \theta_1 = \frac{m\lambda}{d} = m\lambda T,$$

where m is the diffraction order, λ is the wavelength and T is the grating period (inverse of the line spacing d). (see Kim, Nam-Hyong, "How diffractive Surfaces are Modeled in Zemax"). The term $n_2 \sin \theta_2 - n_1 \sin \theta_1$, does not reduce to (n-1) as asserted by applicant. As can be seen in the disclosure of Kim, when θ_1 is equal to 0 for incident light the term is reduced to $n_2 \sin \theta_2 - 0$, and since the values for θ_2 are not supplied by the disclosure of Maruyama, the equation cannot be used to derive the order of light as applicant has suggested.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAWFIK GOMA whose telephone number is (571)272-4206. The examiner can normally be reached on 8:30 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph H. Feild/
Supervisory Patent Examiner, Art Unit
2627

/Tawfik Goma/
Examiner, Art Unit 2627